John Beaudet

Lower Uvas
Los Gatos Creek Project

FEASIBILITY REPORT

To

The Santa Clara Valley
Water Conservation District

McKINNEY ASSOCIATES
CIVIL ENGINEERS AND SURVEYORS
San Jose, California

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February 3, 1958

Santa Clara Valley Water Conservation District
15420 Almaden Road
San Jose, California

Gentlemen:

Pursuant to our letter of agreement dated November 27, 1957, we submit herewith the results of our studies concerning the feasibility of conserving the surplus waters of the Carnadero Group and transporting them to Vasona Reservoir on Los Gatos Creek.

Respectfully submitted,

McKINNEY ASSOCIATES

George M. Sicular

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Project Engineer

GMS:jam

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ACKNOWLEDGEMENTS

In the preparation of this report reference has been made to the following publications:

1. Climatological Data Sheets - United States Weather Bureau
2. Water Supply Papers - United States Geological Survey
3. Bulletin #1, 1951 - State of California Water Resources Board
4. Bulletin #7, June 1955 - State of California Water Resources Board
5. Supplemental Water Requirements of Alameda - Santa Clara - San Benito Counties, May 1957 - Sullivan, Perrott & Dunn, Mark Thomas & Company
6. Investigation of Costs for Importing Water to the Tri-County Service Area by the Del Puerto Canyon, Orestimba Canyon and Pacheco Pass Routes, September 1957 - Creegan and D'Angelo

SECTION I

SCOPE OF THE STUDY AND SUMMARY OF CONCLUSIONS

A. The Scope of the Study

1. Determination of the yield of the Lower Uvas

   (See Plate #I for an outline of the drainage basin).
2. The Conservation Plan
3. Conveyance to Los Gatos Creek
4. Costs
   a. Estimates
   b. Comparative Analysis
5. Additional Benefits

B. Summary of Conclusions

1. The Yield of the Lower Uvas

A hydrologic study indicates that the average annual quantity of surplus water, as measured on Uvas Creek at the Hecker Pass Highway, is about 42,000 acre feet. Of this quantity 36,100 acre feet could be economically conserved. Note that it has been assumed that the South Santa Clara Valley Dam, upstream on the Uvas, will conserve about 11,000 acre feet per year in addition to these quantities.

2. The Conservation Plan

The reader is referred to Plates III, IV, and V entitled "Reservoir Sites". The construction of a dam 120 feet high on the Uvas at the Hecker Pass Highway (Site 1) would create reservoir storage of 100,000 acre feet. The reservoir would be operated between a minimum pool of 6,000 acre feet covering 450 acres, and a maximum conservation pool of 100,000 acre feet covering 2,400 acres. Should a flood occur with the reservoir filled, the level would rise 8 feet, temporarily storing about 20,000 acre feet of the flood flow and reducing the flood wave by about 40 per cent.

Other potential sites exist in the immediate vicinity. The use of these sites would result in lower land and pumping costs, higher dam construction costs and slightly higher annual costs.

3. The Conveyance of Water from the Uvas Reservoir to Los Gatos Creek

The reader is referred to Plate II entitled "Canals and Conduits".

Numerous routes were investigated. Of these, the three most economical are:

A. The Almaden Valley Bypass Route.

B. The Almaden Valley Route.

C. The Calero Reservoir Route.

Routes B and C are described in Section III D under "Conveyance Plans". Route A, the most economical, consists of 33 miles of concrete-lined canal and 5.4 miles of 63 inch concrete pipe. The route passes through the Lower Uvas Valley, across Paradise Valley, enters Santa Clara Valley south of Morgan Hill and continues northwest along the Santa Teresa Hills to their extreme northern tip from which point it crosses Almaden Valley to the edge of Blossom Hill and continues to Vasona Reservoir on Los Gatos Creek.

Water from the Uvas Reservoir is lifted an average of 110 feet into the canal at the reservoir. It flows the remainder of the distance by gravity in a 180 c.f.s. canal and conduit.

4. a. Costs

The cost of the proposed project as outlined above including the dam, road relocations, pumping plant, canal, conduit, engineering, contingencies, and land acquisition is estimated at $12,620,000, based upon an Engineering News Record Index of 735 and should be adjusted in the future as that index fluctuates.

The annual cost, and cost per acre foot of water delivered to Los Gatos Creek, will vary depending upon the means of financing. It is the understanding of this organization that future estimates of costs for water made by the State of California will be based upon a 50 year repayment period and 3½ per cent interest rate. Using this basis, the annual cost of the project will be $619,000 and the cost per acre foot $17.10.

It is possible that $5,000,000 of the project cost could be borrowed from the Federal Government under the Small Reclamation Projects Act of 1956. This type of loan could be repayed at no interest over a 50 year period. So financed, the annual cost would be reduced to $504,000 and the acre-foot cost to $13.90.

b. Comparative Analysis

Previous estimates for water imported to Santa Clara Valley via the Bay Area Aqueduct or the Delta Mendota - Pacheco Tunnel Routes are based upon a 70 year repayment period at 3 per cent interest. Costs under these plans will vary with the amount of water imported. Initially the costs per acre foot are estimated at $35.00 and $24.00 respectively. These costs would drop to $20.00 and $17.00 respectively by 1992.

Using the same basis of financing, the proposed Uvas - Los Gatos project would deliver water at $14.20 per acre foot.

It is important to note that this project does not conflict with the plans referred to above. Those projects will be able, upon expansion, to meet the ultimate requirement of this area. However, the Uvas - Los Gatos project is a very economical source of a large quantity of high quality water. The development of this project could result in large average annual savings when compared with the acquisition of an equal quantity of water from other sources presently under consideration.

5. Additional Benefits

a. Flood Control

The proposed project offers large scale flood protection to South Santa Clara Valley. The capacity of the channel below the dam site is estimated at 5,000 c.f.s. An analysis of the years 1930 to the present indicates that the maximum discharge during that period of time would have been reduced to about 1,000 c.f.s. if the proposed dam had been in operation.

In the past, high flows on the Uvas have caused severe damage to orchards, croplands, and the City of Gilroy, and have contributed to large scale flooding in the area between Gilroy and Hollister and to floods at Watsonville. These high flows are the major obstacle to economical drainage of the Southwest quadrant of Gilroy.

Along its route, the proposed conduit will intercept large quantities of hillside runoff. Further, it crosses nine streams and could be increased in capacity to serve as a conduit for excess flows in these streams.

b. Recreation

The reservoir would cover an area ranging from 450 to 2,400 acres. It would be located in beautiful surroundings, close to Mount Madonna Park and would be easily accessible from Santa Clara Valley. The permanent pool would support fish and wildlife. These factors make this area worthy of consideration as a park site.

c. Supplementary Yield

It is estimated that between 2,000 and 5,000 acre-feet of water will be developed in addition to the quantities noted under B-1. This quantity will be the sum of the storm water intercepted by the canal and the increased yield at the reservoir site. In computing costs no consideration has been taken of this supplementary yield.

SECTION II

DESCRIPTION OF THE AREA

A. The Watershed

The area under investigation is shown on Plate I entitled "Hydrologic Zones".

Uvas Creek, together with its tributaries, drains the southwest corner of Santa Clara County. The entire basin lies on the Eastern slopes of the Santa Cruz Mountains directly South of the watershed of Llagas Creek and West of that portion of Santa Clara County which lies between Morgan Hill and Gilroy. The boundary line between Santa Cruz and Santa Clara County is also the Southwest boundary of the watershed.

Most of the watershed is very steep. The elevation of the Southwest boundary ranges between 1,800 and 3,700 feet. At the proposed damsite the stream has fallen to elevation 250 feet. The average slope in the basin is about 35 per cent. Uvas Creek and its principal tributaries, Little Uvas, Eastman Canyon, Little Arthur and Bodfish Creeks, comprise a very well defined drainage system for the area.

The vegetation in the watershed ranges from grass to very dense woods. Except for some of the bottom land, particularly in the vicinity of the reservoir site, there is little agriculture. Of the land so used, much has been damaged by floods in the past. Some of the uphill lands are used for grazing.

B. Uvas Creek

Uvas Creek is a flashy stream. Storms of high intensity occur over the drainage basin and produce high peak flows. For example, storms in 1938 and in 1955 produced peak discharges of 8,700 and 10,300 cubic feet per second at the United States Geological Survey Gaging Station. The gage was located close to the dam that has just been completed for the South Santa Clara Valley Water Conservation District. The drainage area upstream from the gage is about one-half the area to be controlled by the proposed dam.

Uvas Creek flood-flows caused severe damage during the storms noted above. They destroyed bridges, homes, damaged orchards and farm land, blocked traffic on Monterey Highway and contributed greatly to the flooding in the Soap Lake area South of Gilroy.

The Creek is consistent in producing an average of 68 per cent of its total annual discharge in the three month period including January, February and March, and ninety per cent of the average annual flow occurs in the five months December through April. The average annual discharge at the proposed dam site is estimated at 53,000 acre feet. During the period of 26 years from 1930 to 1956, more than 50 per cent of the total runoff occurred in 24 of the 312 months. During the past 26 years the flow past the United States Geological Survey Gaging Station has exceeded 10,000 acre feet once in a single day, and three times in a period of two days.

As previously noted, the South District has constructed a dam on the Uvas at the same point at which the United States Geological Survey records were collected. The dam creates a reservoir of 10,000 a. f. This together with the fact that most of the annual runoff occurs in a short period of time, leads to the conclusion that the South District's Dam can control only a small portion of the flow in Uvas Creek. Further, the South District's Reservoir cannot be counted upon for flood control since the probability is high that floodflows will occur at a time when the reservoir is full.

SECTION III

THE DEVELOPMENT PLAN

A. Relationship to the South Santa Clara Valley Water Conservation District

The average annual flow at the site of the South District's Dam on the Uvas prior to its construction has been 26,500 acre-feet. The flow at this point in a single month has exceeded 10,000 acre-feet twenty times during the past twenty-six years. Thus the reservoir would have been filled 20 times and without storage volume during the wet months which followed. It is doubtful that this reservoir can produce an average annual yield in excess of 10,000 - 11,000 acre feet.

The proposed dam would be located about 8 miles downstream. Because of the relative locations of the existing dam and the proposed dam, the South District's reservoir would be immune to interference from the proposed reservoir.

The writer is advised that the Santa Clara Valley Water Conservation District does not intend to encroach upon the rights of the South Santa Clara Valley Water Conservation District to the waters of these streams. In any event the Santa Clara Valley Water Conservation District would make applications to appropriate the water in quantities noted in this report. The right to appropriate the water in question would be granted only to the extent that unappropriated water exists, and subject to vested rights.

In a report dated May 1, 1957, to the Alameda - Santa Clara - San Benito Water Authority, Mark Thomas and Company summarized the situation of water supply and demand in South Santa Clara Valley as follows:

"According to Bulletin No. 7 the draft on ground water sources in 1948 was about 46,000 acre feet and the ultimate water requirements for the South Santa Clara Valley will probably be about 61,000 acre feet. These amounts have been substantiated by two separate calculations, one by the State and the other by Blackie and Wood. Blackie and Wood based their estimate on a smaller amount of acreage being only that within the South Santa Clara County Water Conservation District. Taking the difference of acreage into consideration the two figures agree within 10 per cent, which is felt to be a good check under assumptions made.

"Bulletin No. 7 which was published in 1948, states that the safe mean annual ground water yield was 39,300 acre feet. Since that time the Chesbro Reservoir on Llagas Creek has been constructed which produces an average of 5,700 acre feet per year. The present mean annual water supply is approximately 45,000 acre feet. Upon completion of the Uvas Dam this year, the firm annual supply will be increased by 10,000 acre feet. The safe annual supply will then be about 55,000 acre feet which will more than meet the present demand."

In view of the fact that the South District has no immediate needs or plans for the surplus water from Uvas Creek it is felt that conservation and utilization of this surplus water by the North District to serve the clearly established needs of its constituents in Santa Clara County could not properly be construed as encroachment upon the rights and needs of the South Valley.

B. Hydrology

The United States Geological Survey has gaged the flow of Uvas Creek since 1930. The gage is located at the site of the new South Santa Clara Valley Water Conservation District's Dam. The reliability of the records at this gage is judged as good by the United States Geological Survey.

These records have been used together with data on precipitation, area, topography, and vegetation to estimate flows in the Uvas at the proposed damsite. These studies indicate that the flow past the gaging station is about half the flow past the proposed damsite. Uvas Creek drains about 42,000 acres upstream from the proposed dam. The average annual flow past the proposed site is about 53,000 acre feet. The flow in a single year has been as low as 2,800 acre-feet and as high as 136,000 acre-feet. Figure 1, below indicates the number of times the annual runoff of a particular magnitude has occurred. The standard deviation (the measure of variation from the mean flow) is very large and is the best indicator of the wide fluctuation in annual flows.

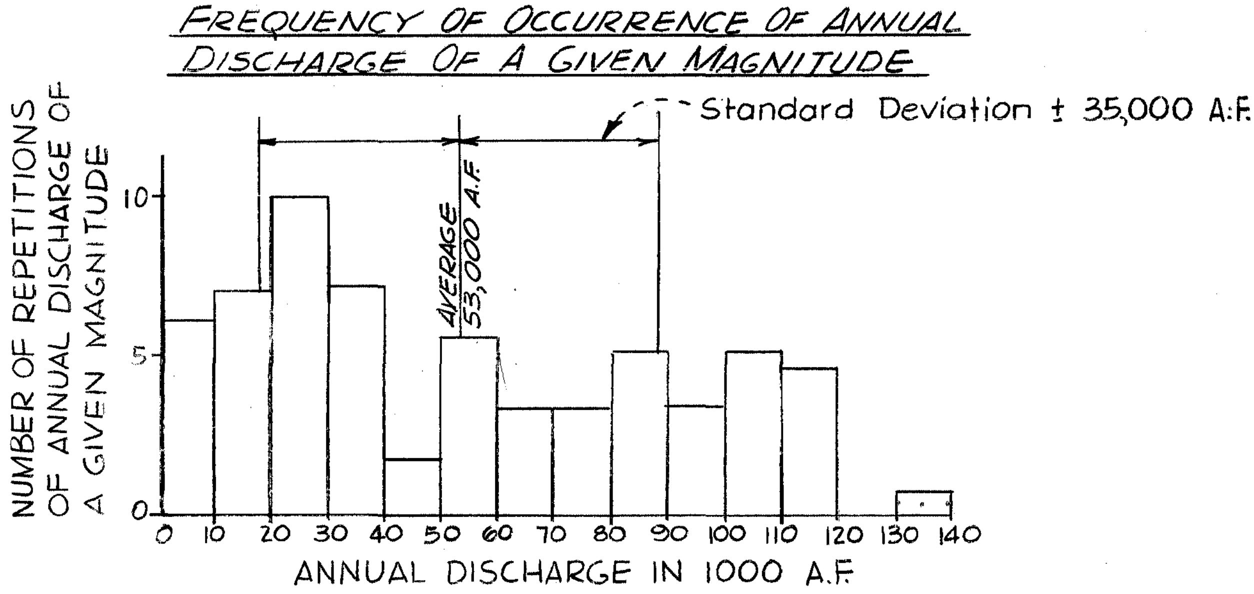


FIGURE 1

Yield and cost estimates were made for 60,000, 80,000 and 100,000 acre feet reservoirs at site number 1. The results of these studies are noted below.

Size of Reservoir (acre-feet)	Average Annual Yield	Cost	
		Average Annual	Per acre-foot
60,000	28,100	$523,000	$18.60
80,000	33,600	$571,000	$17.00
100,000	36,100	$619,000	$17.10

TABLE 1

The preceeding estimates are based upon stream flows measured before the South District constructed its dam on the Uvas. Because of the presence of the new dam, it seems proper to assume that the former mean annual flow of 53,000 acre feet at the proposed damsite may now be reduced to between 42,000 - 43,000 acre feet. The figures in Table 1 are based upon this assumption.

The average annual precipitation over the watershed amounts to 35 inches. Of this quantity, 15 inches runs off in stream flow. About 20 inches of the rainfall is lost in infiltration, transpiration and evaporation. In the reservoir area there will be no transpiration, infiltration will be rapidly reduced as saturation of the site develops, and evaporation is accounted for elsewhere in the reservoir studies. The 20 inches of rainfall now lost in the reservoir area would be reduced to about three inches. This should increase the average annual yield by from 1,500 to 2,000 acre feet and would represent a saving in costs over and above those noted in this report.

A study has been made of the wettest periods in the past to establish the amount of inflow to the proposed reservoir in given periods of time. The following table indicates the amount of water that could be expected to flow into the Uvas over the elapsed times noted during the wettest periods in 100 years.

Duration of Wet Period	Inflow to Proposed Reservoir	
	Upstream dam Initially Full	Upstream Dam Initially Empty
1 Day	21,200 acre feet	11,000 acre feet
2 Days	35,000 "	24,000 "
3 Days	46,400 "	35,000 "
1 Week	53,000 "	42,000 "
1 Month	60,000 "	48,000 "
3 Months	113,000 "	100,000 "

TABLE 2

The table below of average annual yield during "dry" periods of various duration is based upon the following procedure.

> A permanent pool of 6,000 acre feet would be maintained in all years except those in which the total of the inflow to the reservoir plus the net amount retained from the previous year falls below 10,000 acre feet. When this is the case one-half of this total is retained in the reservoir.

TABLE 3

Duration of "Dry" Period Years	Average Annual Yield Acre-Feet
1	3,000
2	3,000
3	4,200
4	6,400
5	9,800
6	11,200
7	11,100
8	10,500
9	10,700

Thus it is indicated that the smallest yield in a given year would have been 3,000 acre-feet during any of the "dry" periods of which we have adequate records.

A greater firm yield can be achieved by increasing the carryover storage. This increase in firm yield would be accompanied by a decrease in the average annual yield. For example, the firm yield could be increased to 10,000 acre feet with a decrease in the average annual yield of about 1,000 acre-feet.

With respect to flood control, an examination of stream flow records indicates that all floods during the past 60 years would have been eliminated on the Uvas by the presence of the proposed dam. The maximum discharge over the spillway would have been reduced to about 1,500 cubic feet per second as compared to a flow of 10,300 cubic feet per second on December 23, 1955. The flow rate into the reservoir would have been very large on several occasions. However, these high flow rates occurred at a time when there would have been ample reserve capacity to store them.

C. Reservoir Studies

The most likely sites for the reservoir were selected from United States Geological Survey Maps of the area. Site number 1 is favored because of low cost for construction and the large storage volume available. Unfortunately this site encompasses comparatively expensive land.

Other sites in the immediate vicinity were investigated, and in each case substantial reductions in land costs were indicated. However, the savings in land costs were more than offset by the increased cost of the dam. The total cost of the project would be increased by about 17 per cent if the better of these alternate sites were used. Sites 1, 2 and 3 are shown on Plates III, IV and V respectively.

A dam 120 feet in height above the stream bed at site #1 would create reservoir storage of 100,000 acre feet. Spillway elevation would be 343 feet and the top of the dam would be at elevation 356 feet. The length along the top of the dam is 3,400 feet. Several minor saddle dams would be required.

The principal reasons for recommending site #1 are:

1. The drainage area upstream is sufficient to provide adequate supplies of runoff.

2. The storage area upstream from the site is large enough to provide adequate storage volume.

3. The size of the dam required is modest in view of the storage volume it will create.

4. Road relocations are extensive but economically justified.

5. Land costs are high but economically justified.

6. Water could be transported economically to Vasona Reservoir from this site.

7. The District could expect an average annual yield of 36,100 acre-feet from a 100,000 acre foot reservoir on site #1.

The features of sites 1, 2 and 3 are shown on Plates III, IV, and V. These charts indicate that each of the sites could provide adequate storage volume. Sites 2 and 3 avoid the necessity for acquiring the agricultural land and homesites in the southernmost area of site #1, and would leave Hecker Pass highway untouched except for a bridge over the diversion from Bodfish Creek. However, the volume of earthwork would be more than doubled and a much greater problem would arise in the prevention of seepage under the dam. Use of these alternate sites would raise the total project cost by about 17 per cent and the cost per acre foot by 14 per cent.

Using reservoir site number 1 would necessitate relocation of two miles of Hecker Pass Highway and three miles of the Watsonville Road. The relocations are relatively easy since the topography is gentle. Side hill cuts, where required, are on moderate slopes.

D. Conveyance Plans

The water conserved by the proposed reservoir must be conveyed to the percolation areas in North Santa Clara Valley. Percolation facilities in Coyote Creek are closest to the proposed dam. However, the full percolation potential of Coyote Creek will probably be utilized by waters from the Anderson-Coyote and possibly Pacheco systems.

For this reason, the plan is to convey the water to Los Gatos Creek at Vasona Reservoir. The conduit and canal for the conveyance of the water would cross Guadalupe and Ross Creeks and pass through the District's Alamitos percolation facilities near Almaden Road. The conduit under construction which runs Northwesterly from Vasona plus the conduit proposed in this report, would result in a complete canal and conduit system along the West side of the central and southern portion of Santa Clara Valley. This system would be capable of delivering water at any point along its route for percolation or local distribution, as desired.

Of the routes investigated, three appear most feasible. They are designated as follows:

A. Almaden Valley By-Pass Route

B. Almaden Valley Route

C. Calero Reservoir Route

These routes are shown on Plate II. They follow identical alignment from the reservoir site through Uvas and Paradise Valleys, entering Santa Clara Valley south of Morgan Hill and following the Santa Teresa Hills to a point in the vicinity of Bailey Avenue. At this point, Alternate C goes over the pass into Calero Reservoir, thence in a northwesterly direction to Vasona Reservoir. This route is the shortest, consisting of 27 miles of lined canal and 4.7 miles of 63 inch concrete pipe. While this is the shortest distance, it involves an additional pump station to lift the water 120 feet across the Santa Teresa Hills into Calero Reservoir. The first cost of this route is $373,000 lower than alternate A and $840,000 less than alternate B. The increased cost for pumping and maintenance leads to a $52,000 greater annual cost than route A, and a $34,000 greater annual cost than route B.#

From Bailey Avenue, routes A and B follow Santa Teresa Hills to their northernmost tip. At this point route A crosses Almaden Valley in a 63 inch pipe for the remainder of the distance to Vasona Reservoir. This route consists of 33.2 miles of lined canal and 5.4 miles of 63 inch pipe, and is the most economical of the three.

# Costs are based upon 50 year repayment period at 3½ per cent interest.

Route "B" consisting of 47.8 miles of lined canal and 4.2 miles of 63 inch pipe follows a route that is identical with that of Route "A" except in the vicinity of Almaden Valley. In this region Route "B" turns Southeast following along the foothills of the Almaden Valley, passing 1.2 miles from Calero Reservoir and then Northwesterly to rejoin Route "A" at the Northern end of the valley. While this route is more expensive than Route "A" it would provide a means of conveying water from Calero, Almaden, and Guadalupe Reservoirs to Los Gatos Creek. The State Division of Water Resources has recommended a conduit from Calero Reservoir to Los Gatos Creek at an estimated cost of $1,018,000. If one-half this cost were to be charged to serving the reservoirs noted above, this route might prove to be the most economical.

A detailed cost breakdown for these routes is included in the next section. Note should be taken of the flood control benefits to be derived from any of these structures. Morgan Hill is now unprotected from hillside runoff adjacent to the town. A high level canal, such as is proposed here, would intercept most of the hillside drainage and minimize the flood problem for that city. In addition, the proposed canal intercepts numerous flood producing streams and could serve to reduce their peak as well as to collect hillside runoff. The proposed canal is designed to convey 180 c.f.s. Its capacity could be enlarged to 400 c.f.s. at an increase of only 25 per cent in the cost of the canal and conduit.

E. Costs and Finances

The costs for the various plans, referred to in this report are summarized in Table 4.

Alternate A-I consisting of Route A and Reservoir Site #1 is most economical. Using this alternate with a 50 year repayment period at 3½ per cent interest, a reservoir of 80,000 acre-feet will yield 33,600 acre-feet per year at $17.00 per acre foot. By increasing the reservoir to 100,000 acre feet the yield will be increased to 36,100 acre-feet and the per acre-foot cost, to $17.10. The larger reservoir is recommended because of the increased yield at an insignificant increase in the unit cost.

This cost could be reduced to $13.90 per acre-foot if a loan of $5,000,000 can be obtained from the Federal Government under its "Small Projects Act of 1956".

Table 4

SUMMARY OF COSTS

UVAS CREEK - LOS GATOS PROJECT

Route - Reservoir Site	A-1	B-1	C-1	A-1	A-1	A-2	A-3
Reservoir Storage - Yield (1000 acre-feet)	100-36.1	100-36.1	100-36.1	80-33.6	60-28.1	100-36.1	100-36.1
Concrete Pipe (size, inches - length, miles)	63"-5.4	63"-4.2	63"-4.5	60"-5.4	57"-5.4	63"-5.4	63"-5.4
Concrete Lined Canal (length, miles)	33.2	47.8	27.0	33.2	33.2	33.2	33.2
Total Fill in Dam (1000 cubic yards)	3,000	3,000	3,000	2,160	1,700	8,200	8,800
Cost for Dam Including Appurtenances	$ 2,880	$ 2,880	$ 2,880	$ 2,500	$ 2,080	$ 6,150	$ 6,700
" " Pipe	1,372	1,034	1,128	1,271	1,200	1,372	1,372
" " Canal	1,663	2,375	1,349	1,663	1,600	1,663	1,663
" " Pumphouse, Pumps & Appurtenances	340	340	600	320	310	340	340
" " Roads	800	800	800	800	800	600	600
" " Bodfish Creek Diversion	-----	-----	-----	-----	-----	200	200
Subtotal	$ 7,055	$ 7,429	$ 6,757	$ 6,554	$ 5,990	$10,325	$10,875
Engineering - 10%	705	743	676	655	599	1,033	1,088
Administration & Contingencies - 15%	1,060	1,115	1,014	983	900	1,550	1,632
Land	3,800	3,800	3,800	3,500	3,200	1,800	1,600
Total Project Cost	$12,620	$13,087	$12,247	$11,692	$10,689	$14,708	$15,195
Annual Costs							
Repayment - 50 years @ 3½%	540	558	523	498	456	629	647
Maintenance	27	27	32	26	25	25	25
Power	52	52	116	47	42	48	46
Total Annual Cost	619	637	671	571	523	702	718
Cost per acre-foot	17.10	17.60	18.60	17.00	18.60	19.40	19.90
Repayment - 70 years @ 3%	434	449	420	401	456	506	521
Maintenance	27	27	32	26	25	25	25
Power	52	52	116	47	42	48	46
Total Annual Cost	513	528	568	474	523	579	592
Cost per acre-foot	14.20	14.60	15.70	14.10	15.40	16.00	16.40
Repayment $5,000,000 - 50 years @ 0% (Small Projects Act - 1956)	100	100	100	100	100	100	100
Repayment Remainder - 50 years @ 3½%	325	343	308	284	242	414	434
Maintenance	27	27	32	26	25	25	25
Power	52	52	116	47	42	48	46
Total Annual Cost	504	522	556	457	409	587	605
Cost per acre-foot	13.90	14.40	15.40	13.60	14.50	16.20	16.70

Unit Costs

Concrete Pipe	50 ft. head	57" - $41/ft.	150 ft. head	57" - $49/ft.
		60" - $45/ft.		60" - $52/ft.
		63" - $47/ft.		63" - $55/ft.

Canal Lining $.25/sq. ft. Major Roads - $140,000/mile
Excavation Canals $.70/c.y. Minor Roads - $100,000/mile
Dams, Including Appurtenances 1,700,000 c.y. at $1.22 - 3,000,000 c.y. at $.96
2,160,000 c.y. at $1.16 - 8,000,000 c.y. at $.75

Note: Costs, except per acre-foot, are in thousands of dollars.

McKinney Associates
2150 The Alameda
Feb. 1958

LOWER UVAS RESERVOIR

Conservation Storage 94,000 A. F.
Permanent Pool 6,000 A. F.

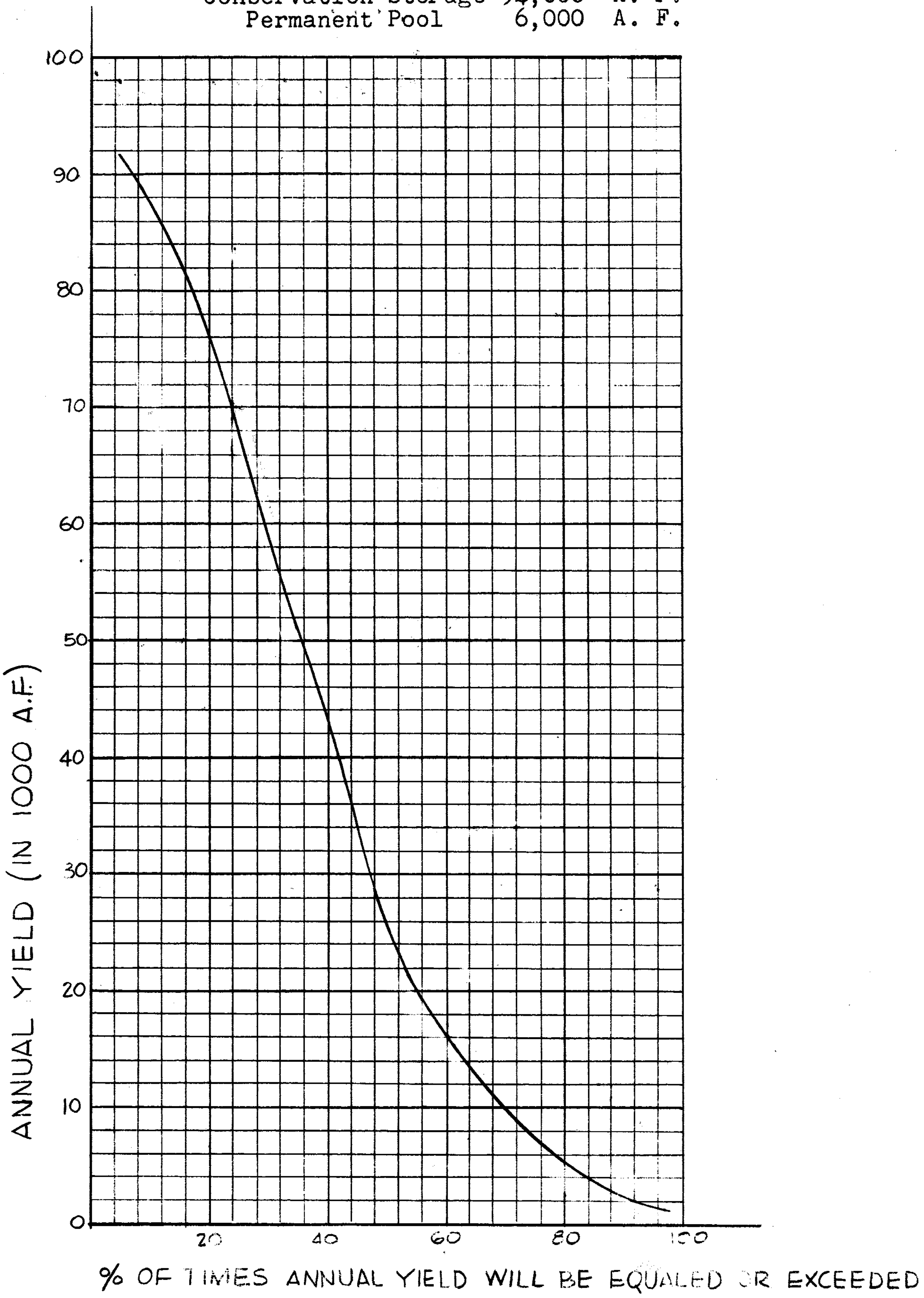


FIGURE 2

PROBABILITY OF EQUALLING OR EXCEEDING AN ANNUAL YIELD OF

F. Summary and Comments

1. An average annual yield of 36,100 acre feet can be obtained at a cost of $13.90 - $17.10 per acre foot, depending upon the means of financing, delivered to Vasona Reservoir.

2. The $13.90 per acre-foot cost is realistic since this project should qualify for an interest free loan of $5,000,000 under the Small Reclamation Projects Act of 1956.

3. The proposed project would provide positive protection against flooding on the Carnadero, and would reduce flooding in the Soap Lake Area of Santa Clara and San Benito Counties. In addition, the floodpeak at Watsonville would be reduced.

As a consequence of construction of the dam, drainage problems in the Gilroy area would be simplified since subdivision drainage could be discharged into the Carnadero. With the canal intercepting large amounts of hillside runoff, Morgan Hill, in particular, would receive considerable flood protection.

4. The reservoir, with its permanent pool and beautiful setting, could serve as a recreational area to meet the growing needs of Santa Clara County.

5. This project would provide 36,100 acre feet of water per year at large annual savings compared with the cost of an equal quantity of water from other sources presently under consideration.

6. The average annual tax per acre based upon the 50 year 3½ per cent interest rate would be about $4.00 ($.40 per $100 of assessed valuation). The resultant raising of ground water levels would reduce average annual pumping costs over the 50 year period by about $24.00 per acre. Thus the ratio of benefits to costs would average six to one.

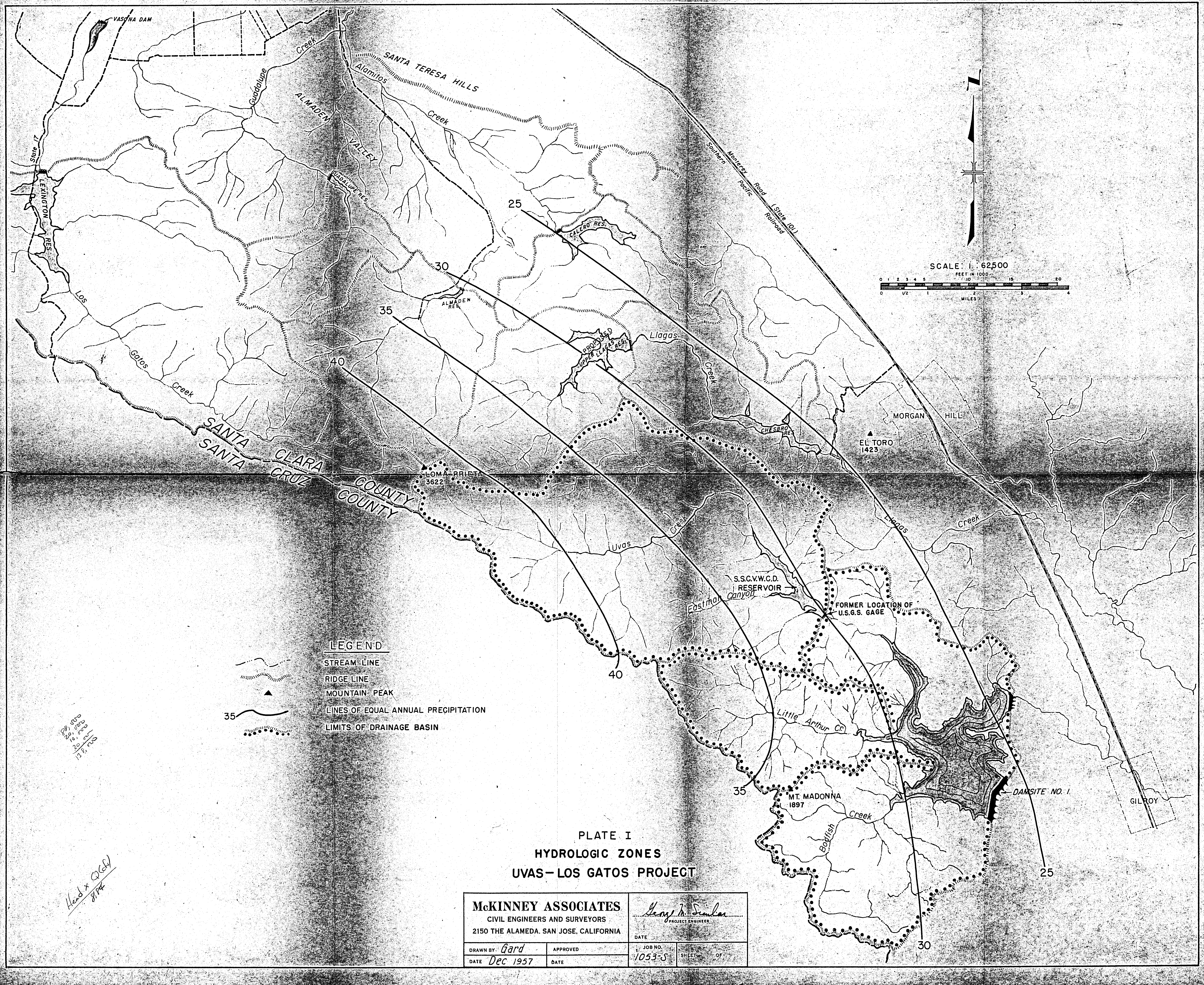


PLATE I
HYDROLOGIC ZONES
UVAS–LOS GATOS PROJECT

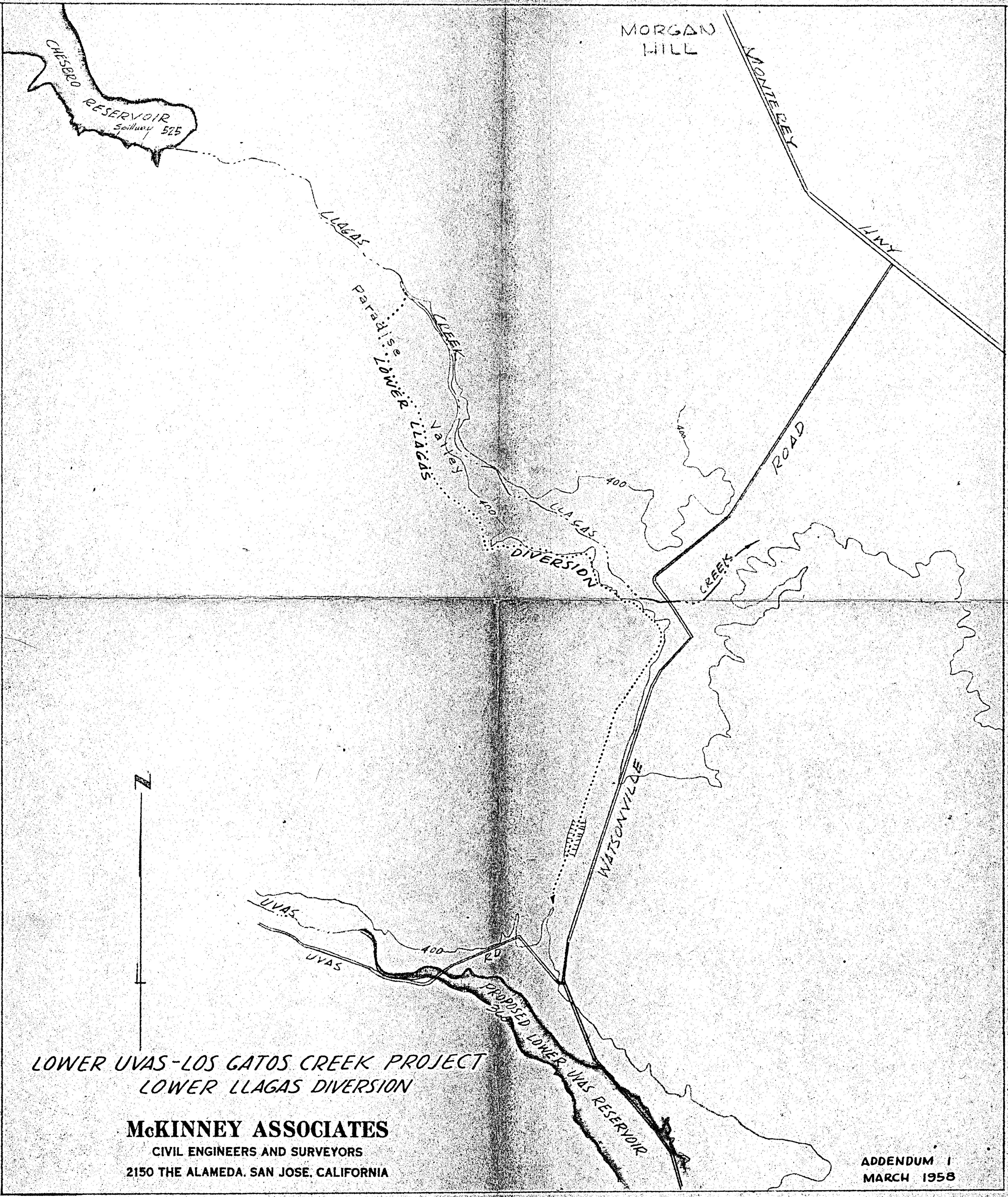
McKINNEY ASSOCIATES
CIVIL ENGINEERS AND SURVEYORS
2150 THE ALAMEDA, SAN JOSE, CALIFORNIA

George M. Sinclair
PROJECT ENGINEER
DATE

DRAWN BY Gard	APPROVED
DATE Dec 1957	DATE
JOB NO. 1053-S	SHEET OF

88,000
20,000
10,000
20,000
138,000

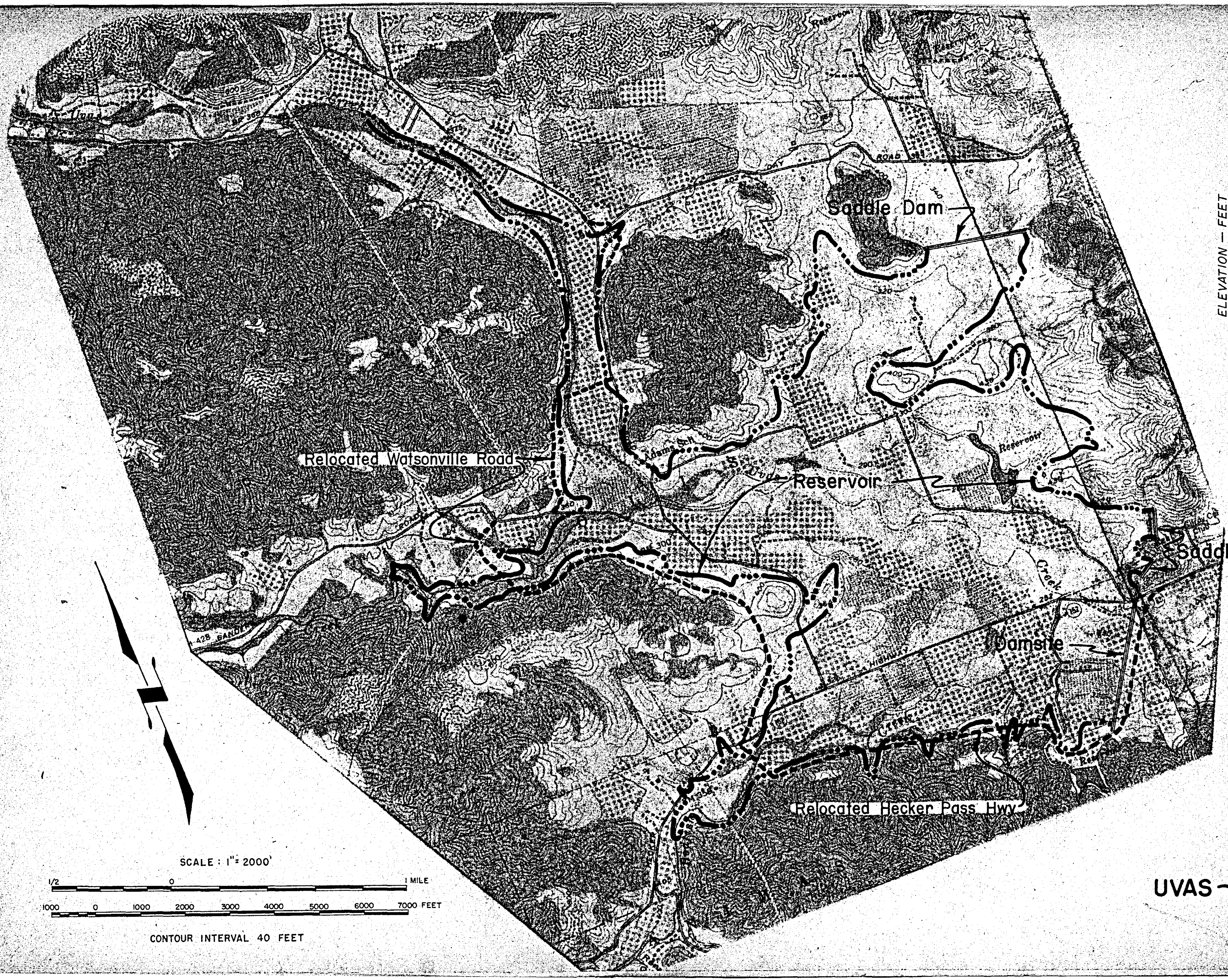
Head × Q(cfs)
8.8

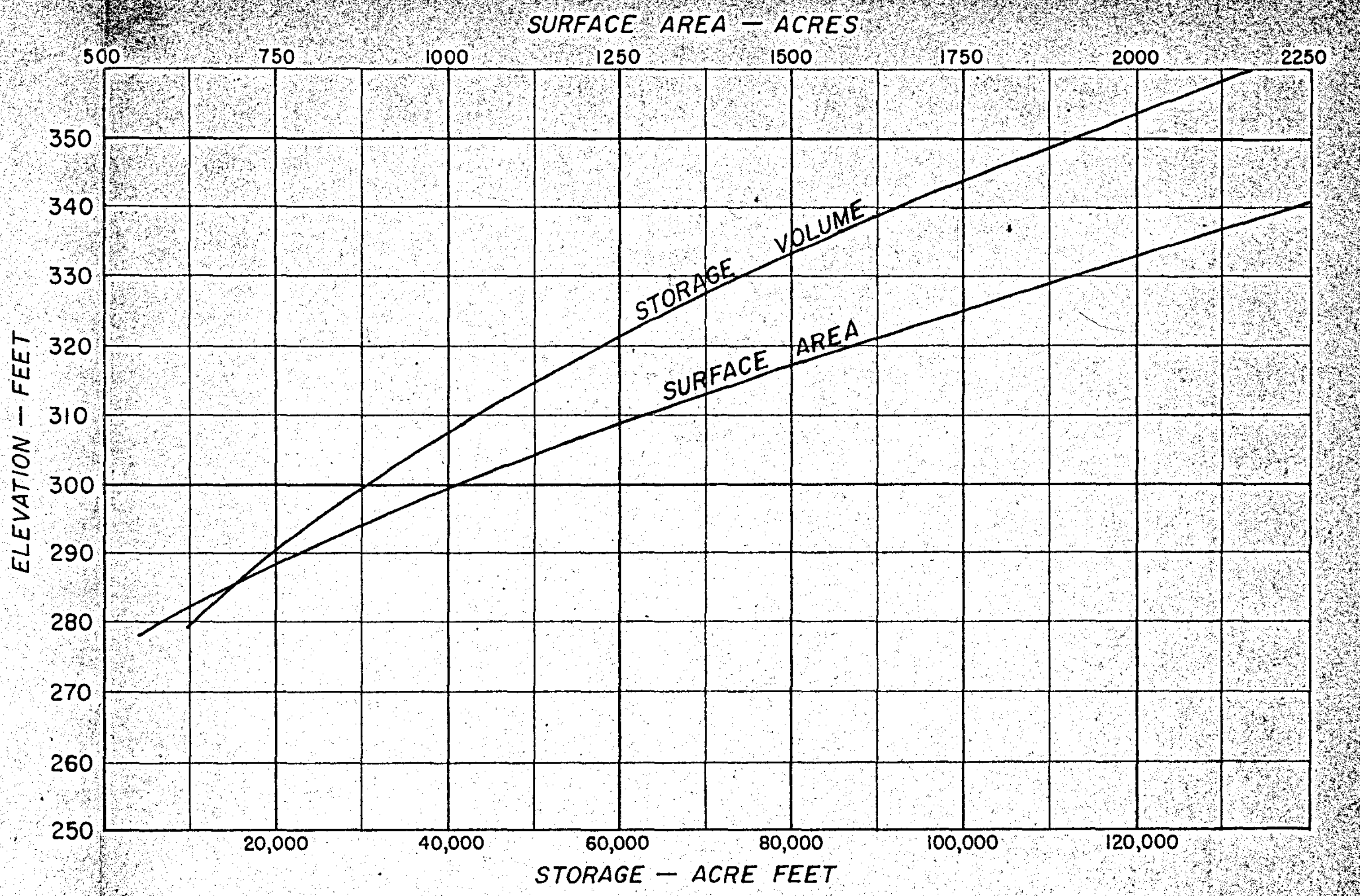


LOWER UVAS-LOS GATOS CREEK PROJECT
LOWER LLAGAS DIVERSION

McKINNEY ASSOCIATES
CIVIL ENGINEERS AND SURVEYORS
2150 THE ALAMEDA, SAN JOSE, CALIFORNIA

ADDENDUM 1
MARCH 1958





Elevation Storage Surface Area Curves

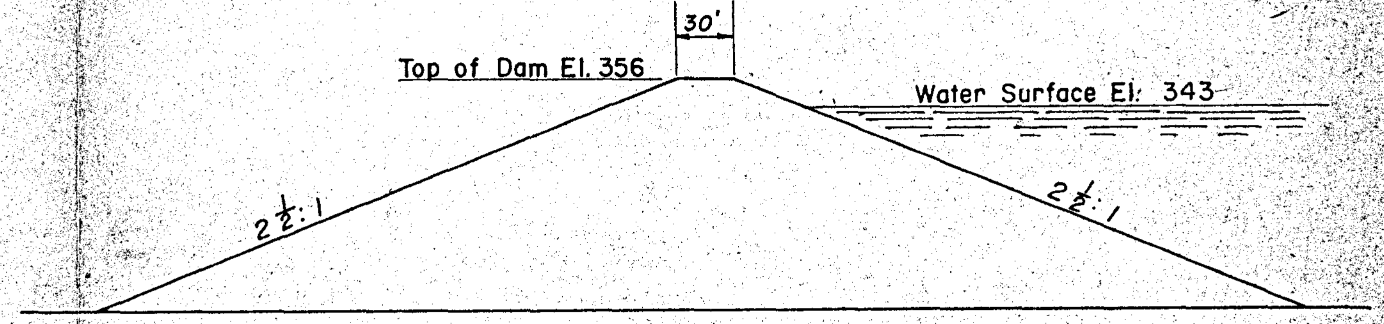
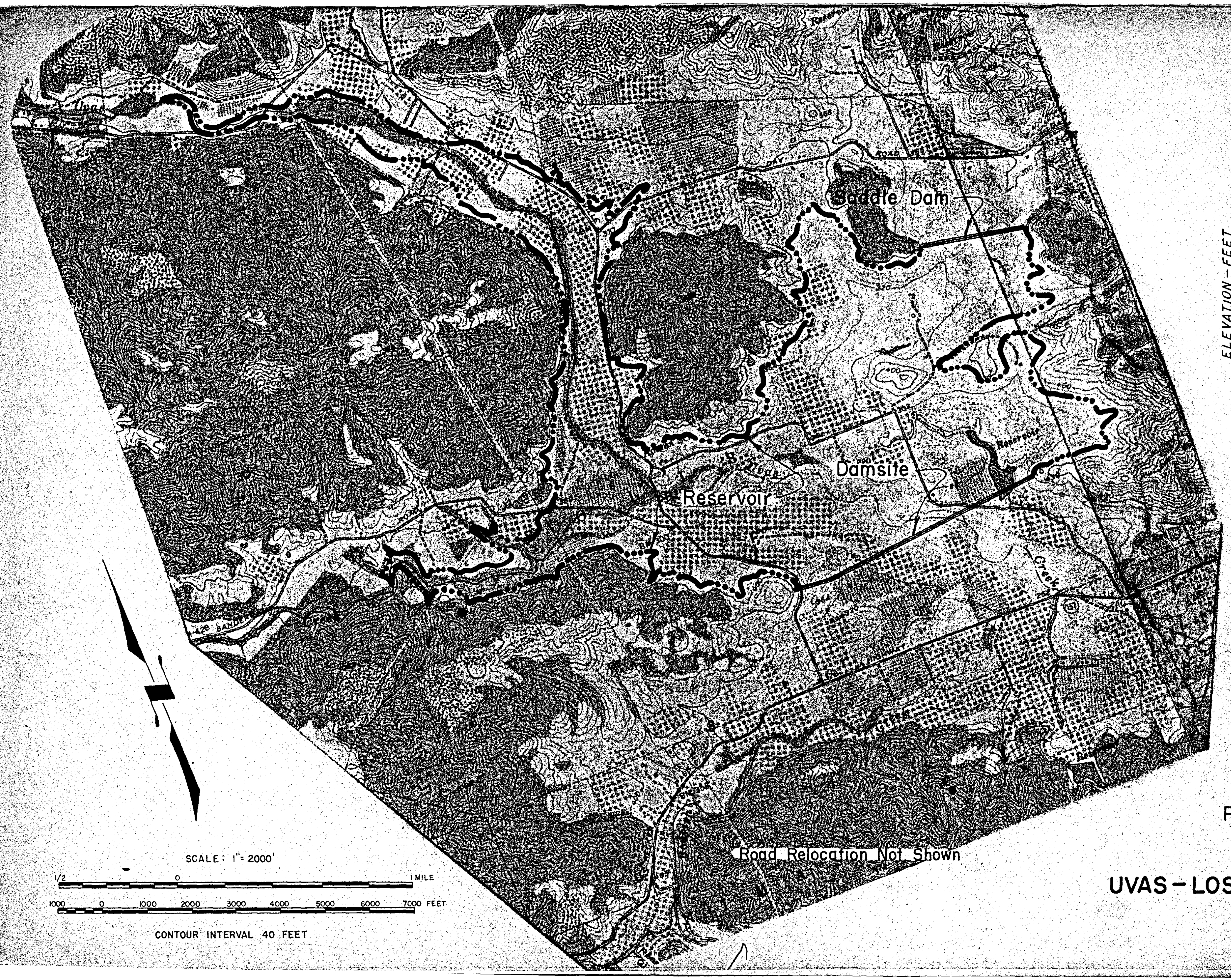


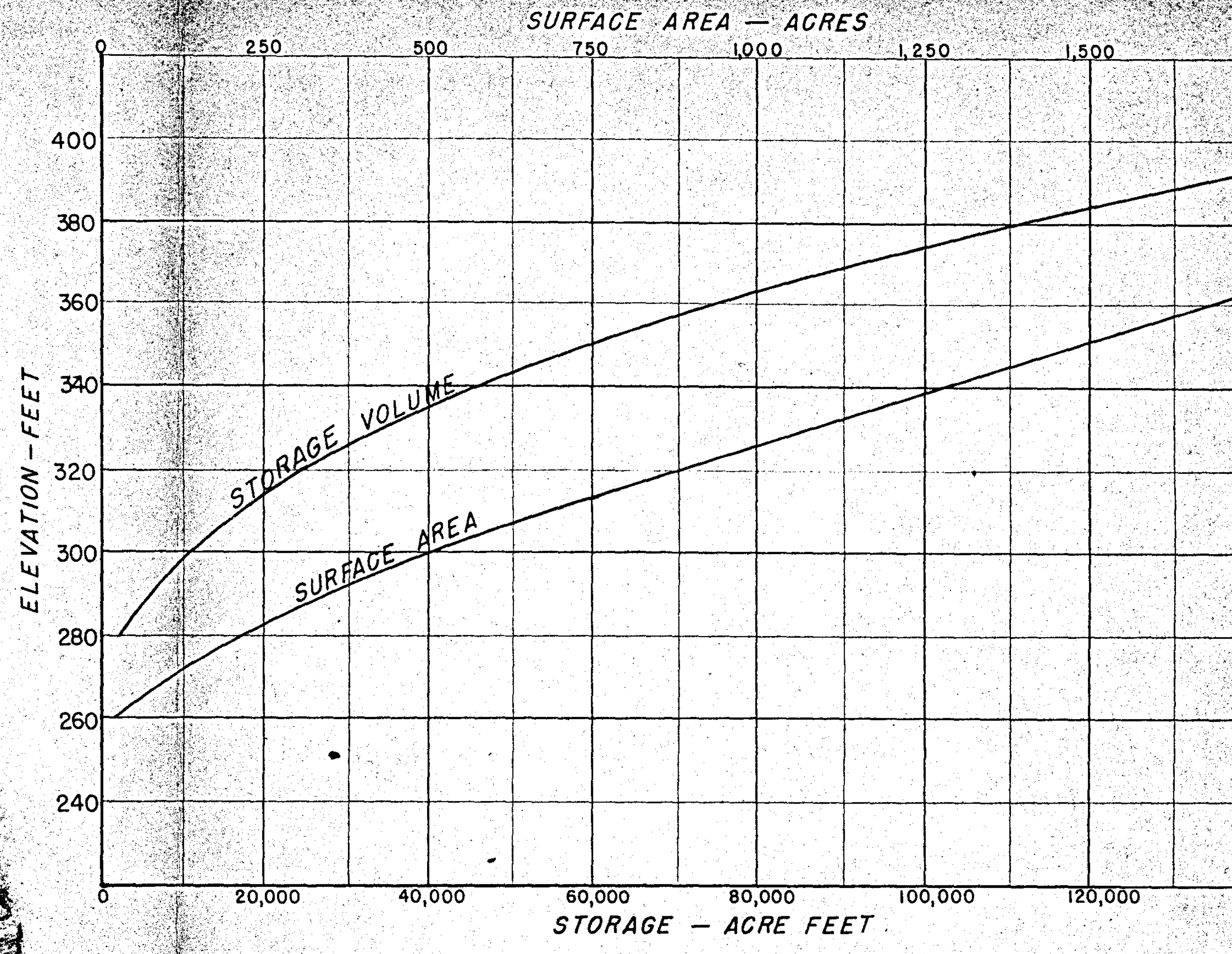
PLATE III

SITE I

UVAS-LOS GATOS PROJECT

McKINNEY ASSOCIATES
CIVIL ENGINEERS AND SURVEYORS
2150 THE ALAMEDA, SAN JOSE, CALIFORNIA





Elevation Storage Surface Area Curves

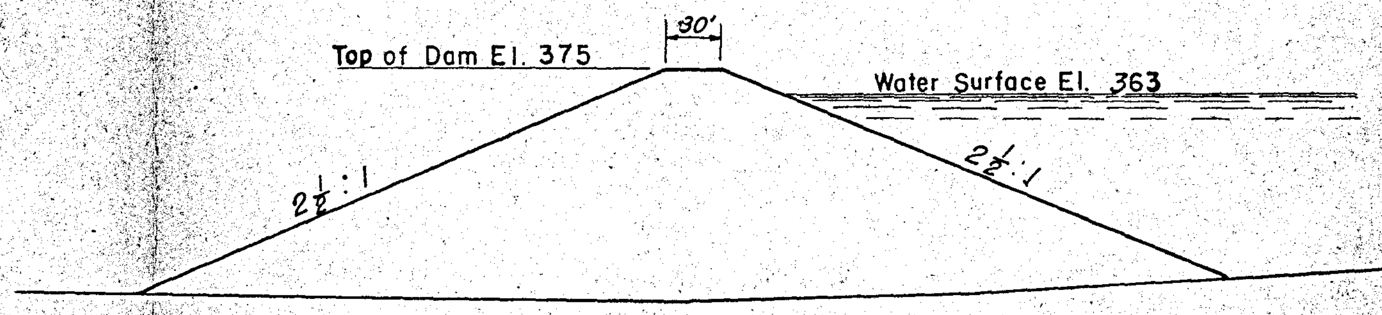


PLATE IV
SITE II
UVAS-LOS GATOS PROJECT

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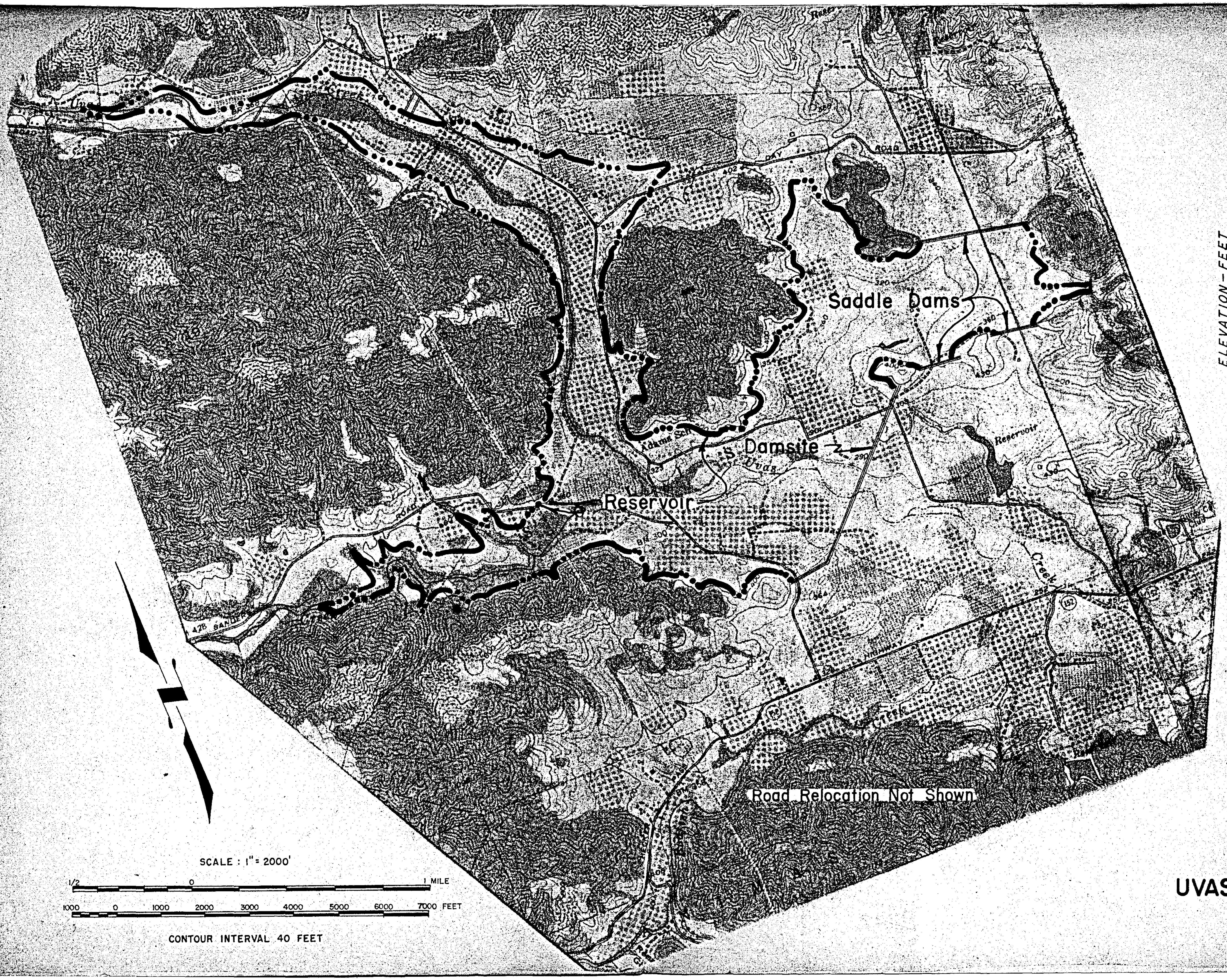
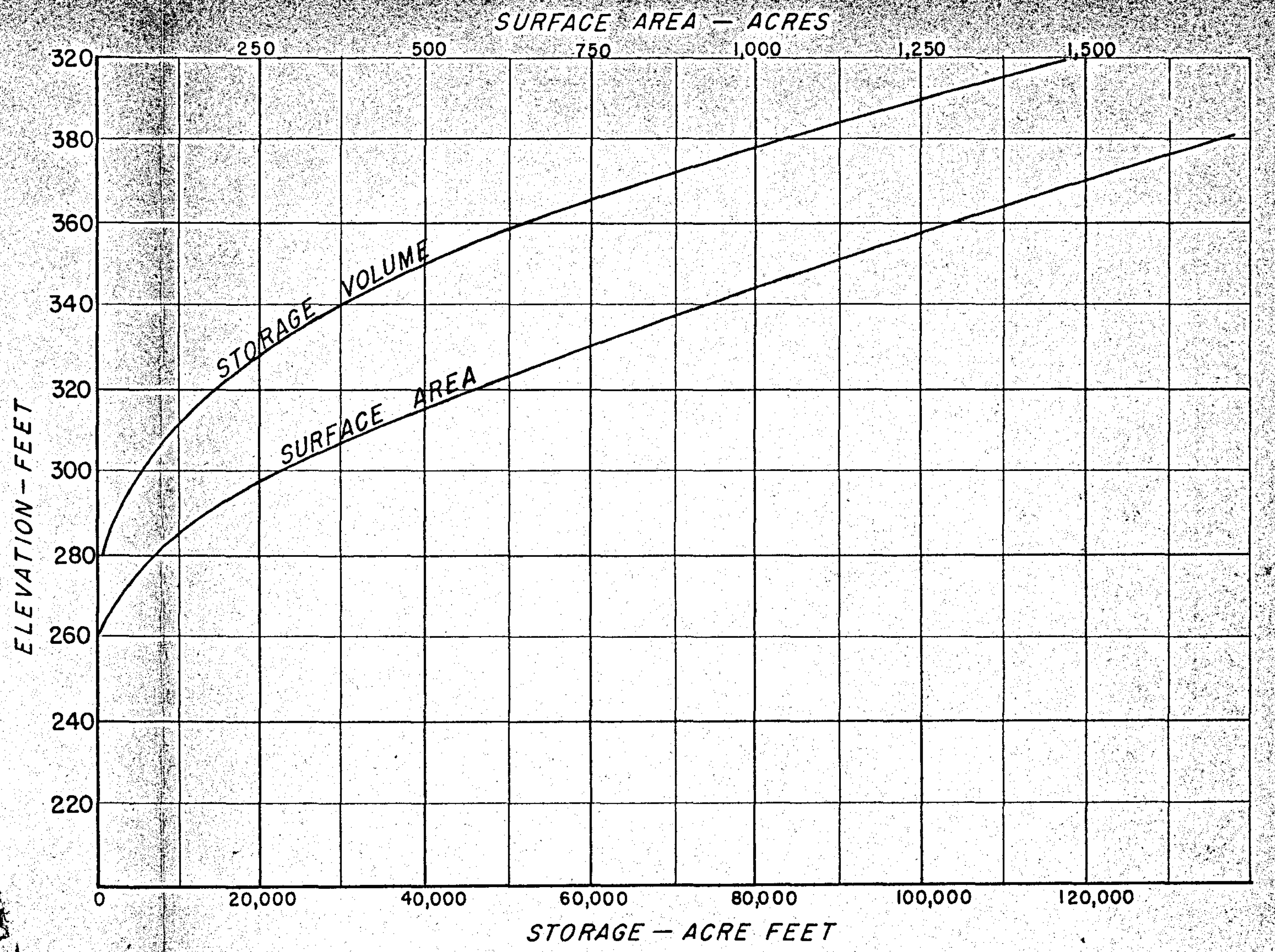
CIVIL ENGINEERS AND SURVEYORS
2150 THE ALAMEDA, SAN JOSE, CALIFORNIA





Elevation Storage Surface Area Curves

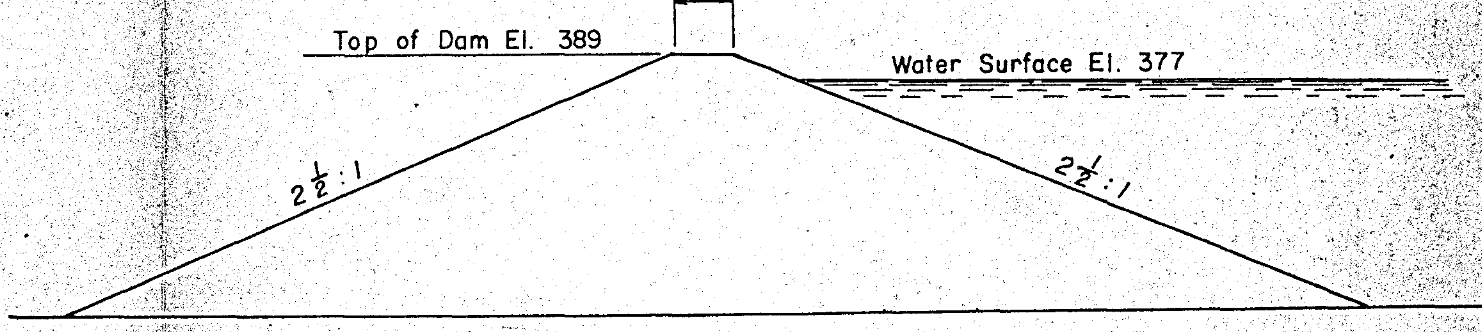


PLATE V
SITE III
UVAS—LOS GATOS PROJECT

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